

REMARKS/ARGUMENTS

Favorable reconsideration of this application, in light of the present amendments and following discussion, is respectfully requested.

Claims 2, 3, and 5-23 are pending. Claims 5-21 are withdrawn. Claims 1 and 4 are canceled without prejudice or disclaimer. Claim 2 is amended to incorporate the features of now-canceled independent Claim 1. Claims 22 and 23 are newly added. No new matter is added.

In the outstanding Office Action, the Election Requirement dated October 4, 2006, was made final. Claims 1-2 were rejected under 35 U.S.C. § 102(e) as anticipated by Kobayashi et al. (U.S. Patent No. 6,844,094, herein "Kobayashi"). Claims 3-4 were rejected under 35 U.S.C. § 103(a) as obvious over Kobayashi.

Regarding the rejection of Claims 1-2 as anticipated by Kobayashi, and the rejection of Claims 3-4 as obvious over Kobayashi, those rejections are respectfully traversed by the present response.

As independent Claim 1 and dependent Claim 4 are canceled without prejudice or disclaimer, Applicants respectfully submit that the rejections of Claims 1 and 4 are moot.

Amended independent Claim 2 recites, in part:

A fuel cell system comprising:
a fuel cell having an anode, a cathode and an electrolyte film put therebetween;
a gas supply unit having a pump, the pump applying negative pressure to the cathode so as to introduce gas containing oxidant to the cathode, wherein the pump applies negative pressure further to the anode so as to supply fuel to the anode.

Accordingly, the pump applies a negative pressure to the cathode **and** applies a negative pressure to the anode of the fuel cell. Support for the amendment to Claim 2 can be found in now-canceled Claim 1 and on page 9, lines 3-4 of the specification, for example.

A claim is anticipated only if each and every element as set forth in the claims is found, either expressly or inherently described, in a single prior art reference. (*Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). Moreover, the identical invention must be shown in as complete detail as is contained in the ... claim. (*Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989)).

Kobayashi fails to teach or suggest "a gas supply unit having a pump, the pump giving negative pressure to the cathode so as to introduce gas containing oxidant to the cathode, wherein the pump gives negative pressure further to the anode so as to supply fuel to the anode" as recited in amended independent Claim 2. Kobayashi merely describes applying "negative pressure" to "the fuel cell" and does not teach or suggest that the pump applies negative pressure to both a cathode and anode as recited in amended Claim 2.

In describing the structure of the fuel cell (1) Kobayashi states:

A cathode side gas passage 1a which allows a supply gas A as an oxidant gas for passing therethrough is provided outside the cathode electrode 1b, while an anode side gas passage 1e which allows hydrogen H to be supplied as a fuel gas for passing therethrough is provided outside the anode electrode 1d. **An inlet and outlet of the cathode side gas passage 1a are connected to the air-supplying apparatus 2, and an inlet and outlet of the anode side gas passage 1d are connected to the hydrogen-supplying apparatus 3.** The configuration of the fuel cell 1 shown in FIG. 2 is schematically shown as a single cell, but an actual fuel cell 1 is made up of a laminate with approximately 200 single cells laminated. Since the fuel cell heats up due to electrochemical reaction during the course of the power generation, the fuel cell 1 has a cooler (not shown) which cools the fuel cell 1.¹

Accordingly, Kobayashi separates the cathode and anode sections of the fuel cell. As shown in Fig. 1, air is supplied to the cathode side and circulated via the pump (24). However, the anode side, which is separated from the cathode side by a membrane (1c),

¹ Kobayashi, column 4, lines 31-45 (emphasis added).

receives a supply of hydrogen circulated via the hydrogen pump (33). The anode side is not in fluid communication with the cathode side. The three-way valve (34) allows hydrogen to recirculate to the suction side of the hydrogen pump (33). As shown in Fig. 1, the hydrogen travels towards the three-way valve (34) and not toward the pump (24). Thus, the cathode side and anode side of the fuel cell (1) are not in fluid communication. Therefore, Applicants respectfully submit that it is clear from Fig. 1 and the rest of the disclosure of Kobayashi that the pump (24) does not apply suction to both the **anode and cathode** sections of the fuel cell. Rather, the pump (24) applies suction only to the cathode section of the fuel cell.

The negative pressure described in Kobayashi is applied to the cathode side gas passage (1a) and, at the most, the cathode (1b) of the fuel cell, not of the anode (1d). The suction pump (24) communicating with the cathode (1b) generates the negative pressure (see column 5, lines 47-49). The negative pressure is measured by the pressure sensor (P) installed in the air-supplying apparatus (2) (see Fig. 1). No such pressure sensor is found in the anode side of the Kobayashi system.

The pressure in the hydrogen-supplying apparatus (3) communicating with the anode (1d) is independently discussed in paragraphs from column 6, line 42 to column 7, line 6 of Kobayashi. Even if the suction pump (24) depressurizes the cathode (1b) to be negative, the negative pressure does not reach the anode (1d) because the electrolyte membrane (1c) intervening therebetween functions as a critical barrier to the propagation of pressure. Therefore, "negative pressure" applied to "the anode" by the same pump as applies negative pressure to the cathode side is not taught or suggested by Kobayashi as recited in amended independent Claim 2.

Kobayashi, from column 6, line 42 to column 7, line 6, describes that negative pressure is also applied to the anode (1d) by the pump (24). However, the negative pressure in the anode (1d) is not provided by the suction pump (24), but is instead created by the

regulator (32) in combination with the hydrogen gas cylinder (31) and the hydrogen-circulating pump (33). The hydrogen-circulating pump (33) is necessary in the Kobayashi system because the fuel (hydrogen) must be kept from entering into the anode (1d) by the atmospheric pressure with the pump (33). The requirement of two independent pumps (24) and (33) to apply negative pressure to two isolated sections of a fuel cell is different from the features recited in amended Claim 2, in which merely a single pump is recited as applying the negative pressure to the cathode and anode.

Accordingly, Kobayashi fails to teach or suggest the feature of "a gas supply unit having a pump, the pump applying negative pressure to the cathode so as to introduce gas containing oxidant to the cathode, wherein the pump applies negative pressure further to the anode so as to supply fuel to the anode" as recited in amended Claim 2. Therefore, Applicants respectfully submit that the rejection of Claim 2 as anticipated by Kobayashi is overcome.

Modification of Kobayashi to omit the hydrogen-circulating pump (33) and add structure for having the suction pump (24) provide negative pressure to the anode (1d) as recited in amended independent Claim 2 would not have been obvious to one of ordinary skill in the art at the time the invention recited in Claim 2 was made. In regard to the omission of the hydrogen-circulating pump (33), the invention recited in amended Claim 2 circulates the exhaust fuel (hydrogen) from the anode without the requirement of a second pump as is required by Kobayashi (see column 7, lines 1-6 of Kobayashi). Omission of an element and retention of its function is an *indicia* of unobviousness.

MPEP § 2144.04(II)(B) states:

B. Omission of an Element with Retention of the Element's Function Is an Indicia of Unobviousness

Note that the omission of an element and retention of its function is an *indicia* of unobviousness. *In re Edge*, 359 F.2d 896, 149 USPQ 556 (CCPA 1966) (Claims at issue were

directed to a printed sheet having a thin layer of erasable metal bonded directly to the sheet wherein said thin layer obscured the original print until removal by erasure. The prior art disclosed a similar printed sheet which further comprised an intermediate transparent and erasure-proof protecting layer which prevented erasure of the printing when the top layer was erased. The claims were found unobvious over the prior art because although the transparent layer of the prior art was eliminated, the function of the transparent layer was retained since appellant's metal layer could be erased without erasing the printed indicia).²

Further in regard to modification of Kobayashi to have the suction pump (24) to apply negative pressure further to the anode (1d), such a modification would require that the exhaust hydrogen of the anode (1d) is introduced to the suction pump (24) and then exhausted to the exterior (see column 7, lines 2-3 and Fig. 1 of Kobayashi). Such a modification would cause a considerable amount of the hydrogen to be wasted. This situation is disadvantageous to electric power generation, the intended purpose of Kobayashi. If a proposed modification would render the cited art being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. Please see MPEP § 2143.01(V) and *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

For at least the foregoing reasons, Applicants respectfully submit that amended independent Claim 2 patentably distinguishes over Kobayashi.

Claim 3 depends from amended independent Claim 2 and patentably distinguishes over Kobayashi for at least the same reasons as amended independent Claim 2 does.

New Claims 22 and 23 are encompassed in the species corresponding to elected Claims 1-4 and are supported by the originally filed specification, at least at page 8, line 18 to page 19, line 19, and Fig. 5. The recited suction port and pressure port can be considered as

² Manual of Patent Examining Procedure, Eighth Edition, Rev. 3, August 2005.

an inherent teaching because one skilled in the art would understand this fact as apparent from the following dictionary recitation.

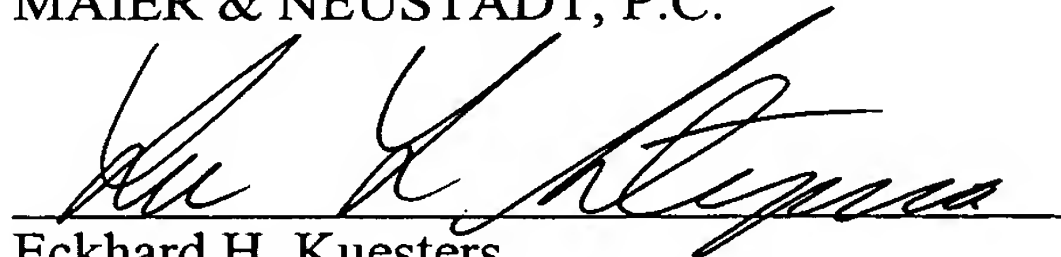
Pump [MECH ENG] A machine that draws a fluid into itself through an entrance port and forces the fluid out through an exhaust port. (McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition).

Newly added independent Claim 22 recites substantially similar features to those discussed above regarding amended independent Claim 2 and patentably distinguishes over Kobayashi for at least the same reasons. Claim 23 depends from Claim 22 and patentably distinguishes over Kobayashi for at least the same reasons.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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